

## BIOLOGICAL ENVIRONMENT OF OJAI BASIN STREAMS

This subsection presents the predominant plant species observed during field surveys, and presents the habitats observed during water quality sampling and stream characterization studies. The habitat classifications into floristic plant communities are provided, along with a description of each habitat type and plant community. Habitat classifications and descriptions are based on the U.S. Fish and Wildlife Service classification system, *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979), and the California Native Plant Society classification system, *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995). The predominant plant and wildlife species observed in the field are also provided below.

### Predominant Plant Species

The predominant plant species observed during the field studies are listed below in Table 20, Predominant Plant Species of the Ojai Basin Streams. Although a thorough floristic assessment was not performed, the predominant plants observed were noted, and the majority of those predominant plants observed are introduced/ornamental plant species.



**Photograph 19** (left). Fox Canyon Barranca, Mugwort (*Artemisia douglasiana*) in foreground (27 May 2004).

**Photograph 20** (middle). Ojai Creek, California Wild Grape (*Vitis californica*) climbing up old-growth sycamores and oaks (27 November 2004).

**Photograph 21** (right). Post Office Creek, Pacific Blackberry (*Rubus ursinus*) creating the groundcover (11 January 2005).

### Habitat Descriptions

Habitats of the Ojai Basin streams project area have evolved to the specific conditions of the coastal climate of Southern California, and the plants of these communities show traits adapted to fit their niche. Elevation, aspect (shade or sun), rainfall and water availability are the primary determinants of where each community exists. Plants play a crucial role in the ecology of the watershed. They provide the habitat, food, and shelter for the dozens of animal species that inhabit the region. Plants help to prevent soil erosion by literally holding the soil together with their root systems. The leaf and branch canopies also reduce the impact of rain, and by absorbing rainfall from the soil, they help to reduce runoff too.

One problem for the native vegetation in these watersheds is the invasion of non-native species of plants – foreign plant species that have been introduced, intentionally or unintentionally, and then thrive in the local environment, often because of the absence of natural predators. In the process of replacing native species, they often harm local animals un-adapted to living with and on these invaders. Invasive, non-native species damage the biodiversity of both plants and animals in our local area. (Leydecker and Grabowsky 2004.)

**Table 20. Predominant Plant Species of the Ojai Basin Streams**

Scientific Name <sup>12</sup>	Common Name <sup>13</sup>	Habit <sup>14</sup>	WIS <sup>15</sup>	Family
<i>Acacia sp.</i> +	Acacia/Wattle	T	.	Fabaceae
<i>Ailanthus altissima</i> +	Tree-of-heaven	T	FACU	Simaroubaceae
<i>Alnus rhombifolia</i>	White Alder	T	FACW	Betulaceae
<i>Amaranthus albus</i> *	Tumbleweed	AH	FACU	Chenopodiaceae
<i>Ambrosia psilostachya</i> var. <i>californica</i>	Western Ragweed	BH	FAC	Asteraceae
<i>Apium graveolens</i> *	Celery	PH	FACW*	Apiaceae
<i>Artemisia californica</i>	California Sagebrush	S	.	Asteraceae
<i>Artemisia douglasiana</i>	Mugwort	PH	FACW	Asteraceae
<i>Arundo donax</i> *	Giant Reed	PG	FACW	Poaceae
<i>Avena barbata</i> *	Slender Wild Oat	AG	.	Poaceae
<i>Azolla filiculoides</i>	Mosquito Fern	AF	OBL	Azollaceae
<i>Baccharis pilularis</i>	Coyote Brush	S	.	Asteraceae
<i>Baccharis salicifolia</i>	Mulefat	S	FACW	Asteraceae
<i>Brassica nigra</i> *	Black Mustard	AH	.	Brassicaceae
<i>Brickellia californica</i>	California Brickellbush	S	FACU	Asteraceae
<i>Bromus diandrus</i> *	Ripgut Grass	AG	(FACU)	Poaceae
<i>Bromus hordeaceus</i> *	Soft Chess	AG	FACU-	Poaceae
<i>Bromus madritensis</i> ssp. <i>Rubens</i> *	Red Brome	AG	NI	Poaceae
<i>Carduus pycnocephalus</i> *	Italian Thistle	AH	.	Asteraceae
<i>Ceanothus spinosus</i>	Greenbark Ceanothus	S	.	Rhamnaceae
<i>Centaurea melitensis</i> *	Tocalote	AH	.	Asteraceae
<i>Chenopodium album</i> *	Lambsquarters	AH	FAC	Chenopodiaceae
<i>Conyza canadensis</i>	Common Horseweed	AH	FAC	Asteraceae
<i>Cynodon dactylon</i> *	Bermuda Grass	PG	FAC	Poaceae
<i>Cyperus eragrostis</i>	Umbrella Sedge	PH	FACW	Cyperaceae
<i>Epilobium ciliatum</i> ssp. <i>Ciliatum</i>	Northern Willow-herb	AH	FACW	Onagraceae
<i>Eremocarpus setigerus</i>	Dove Weed	AH	.	Euphorbiaceae
<i>Eucalyptus globulus</i> +	Tasmanian Blue Gum	T	.	Myrtaceae
<i>Ficus carica</i> +	Fig	T	.	Moraceae
<i>Foeniculum vulgare</i> *	Sweet Fennel	PH	FACU	Apiaceae
<i>Fraxinus sp.</i> +	Ash	T	.	Oleaceae
<i>Gnaphalium californicum</i>	Green Everlasting	AH	.	Asteraceae

<sup>12</sup> Scientific nomenclature follows Hickman (1993).

“\*” indicates nonnative species which have become naturalized or persist without cultivation.

“+” indicates planted or escaped introduced ornamental species.

<sup>13</sup> Common names follow Abrams and Ferris (1960), DeGarmo (1980), Hickman (1993), and Niehaus and Ripper (1976).

<sup>14</sup> Habit definitions: PG = perennial grass; AG = annual grass; PH = perennial herb; AH = annual herb; PV = perennial vine; BH = biennial herb; S = shrub; T = tree.

<sup>15</sup> WIS = Wetland indicator status (Reed 1988):

OBL = obligate wetland species, occurs almost always in wetlands (>99% probability)

FACW = facultative wetland species, usually found in wetlands (67-99% probability).

FAC = facultative species, equally likely to occur in wetlands or nonwetlands (34-67% probability).

FACU = facultative upland species, usually occur in nonwetlands (67-99% probability).

+ or - symbols are modifiers that indicate greater or lesser affinity for wetland habitats.

NI = no indicator has been assigned due to a lack of information to determine indicator status.

\* = a tentative assignment to that indicator status by Reed (1988).

A period "." indicates that no wetland indicator status has been given in Reed (1988).

Parentheses around an indicator status indicates the wetland status as suggested by David L. Magney.

**Table 20. Predominant Plant Species of the Ojai Basin Streams (continued)**

Scientific Name	Common Name	Habit	WIS	Family
<i>Gnaphalium luteo-album</i> *	Cudweed Everlasting	AH	FACW-	Asteraceae
<i>Hedera helix</i> +	English Ivy	PV	.	Araliaceae
<i>Heteromeles arbutifolia</i>	Toyon	S	.	Rosaceae
<i>Heterotheca grandiflora</i>	Telegraph Weed	PH	.	Asteraceae
<i>Hirschfeldia incana</i> *	Summer Mustard	PH	.	Brassicaceae
<i>Hordeum murinum</i> ssp. <i>glaucum</i> *	Summer Barley	AG	.	Poaceae
<i>Ipomoea</i> sp. +	Morning-glory	PV	.	Convolvulaceae
<i>Juglans californica</i> var. <i>californica</i>	Southern California Black Walnut	T	FAC	Juglandaceae
<i>Juglans regia</i> +	English Walnut	T	.	Juglandaceae
<i>Lactuca serriola</i> *	Prickly Wild Lettuce	AH	FAC	Asteraceae
<i>Lemna</i> cf. <i>minuscula</i>	Duckweed	AH	OBL	Lemnaceae
<i>Lepidospartum squamatum</i>	Scalebroom	S	(FACW)	Asteraceae
<i>Lessingia filaginifolia</i> var. <i>filaginifolia</i>	Cudweed Aster	PH	.	Asteraceae
<i>Leymus condensatus</i>	Giant Wildrye	PG	FACU	Poaceae
<i>Lolium multiflorum</i> *	Italian Ryegrass	AG	FAC*	Poaceae
<i>Lotus scoparius</i> var. <i>scoparius</i>	Deerweed	S	.	Fabaceae
<i>Malosma laurina</i>	Laureleaf Sumac	S	.	Anacardiaceae
<i>Malva parviflora</i> *	Cheeseweed	AH	.	Malvaceae
<i>Marah macrocarpus</i>	Man-root	PV	.	Cucurbitaceae
<i>Marrubium vulgare</i> *	White Horehound	S	FAC	Lamiaceae
<i>Medicago polymorpha</i> *	Bur-clover	AH	(FACU-)	Fabaceae
<i>Melilotus alba</i> *	White Sweetclover	A/BH	FACU+	Fabaceae
<i>Melilotus indica</i> *	Sourclover	AH	FAC	Fabaceae
<i>Mentha spicata</i> var. <i>spicata</i> +	Spearmint	PH	OBL	Lamiaceae
<i>Mentha</i> sp.	Chocolate Mint	PH	OBL/FACW	Lamiaceae
<i>Nerium oleander</i> +	Oleander	S	.	Apocynaceae
<i>Nicotiana glauca</i> *	Tree Tobacco	S	FAC	Solanaceae
<i>Olea europea</i> +	Olive	T	.	Oleaceae
<i>Phoenix canariensis</i> +	Canary Island Date Palm	T	.	Arecaceae
<i>Phoradendron macrophyllum</i>	Bigleaf Mistletoe	PH	.	Viscaceae
<i>Picris echioides</i> *	Bristly Ox-tongue	AH	FAC*	Asteraceae
<i>Piptatherum miliaceum</i> *	Smilo Grass	PG	(FACU)	Poaceae
<i>Plantago lanceolata</i> *	English Plantain	PH	FAC-	Plantaginaceae
<i>Platanus racemosa</i> var. <i>racemosa</i>	California Sycamore	T	FACW	Platanaceae
<i>Plumbago ariculata</i> +	Cape Plumbago	S	.	Plumbaginaceae
<i>Polypogon monspeliensis</i> *	Rabbitsfoot Grass	AG	FACW*	Poaceae
<i>Populus fremontii</i> ssp. <i>fremontii</i>	Fremont Cottonwood	T	FACW	Salicaceae
<i>Prunus ilicifolia</i>	Hollyleaf Cherry	S	.	Rosaceae
<i>Quercus agrifolia</i> var. <i>agrifolia</i>	Coast Live Oak	T	(FACU)	Fagaceae
<i>Quercus lobata</i>	Valley Oak	T	FACU	Fagaceae
<i>Raphanus sativa</i> *	Wild Radish	AH	.	Brassicaceae
<i>Rhamnus tomentella</i>	Hoary Coffeeberry	S	.	Rhamnaceae
<i>Ricinus communis</i> *	Castor Bean	S	FACU	Euphorbiaceae
<i>Rorippa nasturtium-aquaticum</i>	Water Cress	PH	OBL	Brassicaceae
<i>Rosa californica</i>	California Wild Rose	S	FAC+	Rosaceae
<i>Rubus ursinus</i>	Pacific Blackberry	PV	FACW*	Rosaceae

**Table 20. Predominant Plant Species of the Ojai Basin Streams (continued)**

Scientific Name	Common Name	Habit	WIS	Family
<i>Rumex crispus</i> *	Curly Dock	PH	FACW-	Polygonaceae
<i>Salix exigua</i>	Narrow-leaved Willow	S	OBL	Salicaceae
<i>Salix laevigata</i>	Red Willow	T	FACW	Salicaceae
<i>Salix lasiolepis</i>	Arroyo Willow	T	FACW	Salicaceae
<i>Salix lucida</i> ssp. <i>lasiandra</i>	Shining Willow	T	OBL	Salicaceae
<i>Salvia apiana</i>	White Sage	S	.	Lamiaceae
<i>Salvia leucophylla</i>	Purple Sage	S	.	Lamiaceae
<i>Salvia mellifera</i>	Black Sage	S	.	Lamiaceae
<i>Sambucus mexicana</i>	Blue Elderberry	S/T	FAC	Caprifoliaceae
<i>Schoenoplectus</i> [ <i>Scirpus</i> ] <i>californicus</i>	California Bulrush	PH	OBL	Cyperaceae
<i>Schinus molle</i> +	Peruvian Pepper Tree	T	.	Anacardiaceae
<i>Solanum americanum</i> *	White Nightshade	A/PH	FAC	Solanaceae
<i>Sonchus oleraceus</i> *	Common Sow-thistle	AH	UPL+	Asteraceae
<i>Spartium junceum</i> *+	Spanish Broom	S	.	Fabaceae
<i>Toxicodendron diversilobum</i>	Western Poison Oak	S/V	.	Anacardiaceae
<i>Typha domingensis</i>	Southern Cattail	PH	OBL	Typhaceae
<i>Typha latifolia</i>	Broad-leaved Cattail	PH	OBL	Typhaceae
<i>Verbena lasiostachys</i>	Western Verbena	AH	.	Verbenaceae
<i>Veronica anagallis-aquatica</i> *	Common Speedwell	PH	OBL	Scrophulariaceae
<i>Vinca major</i> +	Periwinkle	PV	.	Apocynaceae
<i>Vitis californica</i>	California Wild Grape	PV	FACW	Vitaceae
<i>Washingtonia robusta</i> *+	Mexican Fan Palm	T	(FAC)	Arecaceae
<i>Xanthium strumarium</i>	Cocklebur	AH	FAC	Asteraceae
<i>Yucca elephantipes</i> +	Giant Yucca	T	.	Agavaceae

Two primary wetland systems were observed according to Cowardin et al. (1979): the Palustrine System (riparian habitats) and the Riverine System (aquatic habitats). Within each of the two systems, the class and subclass are provided and described. Along with each class/subclass, the respective plant series/alliance name and description are given as a cross reference, since these two classifications provide somewhat different information regarding the observed habitats throughout Ojai. The species associated with each plant community are also listed within each description (common names are provided once only).

Table 21, Plant Communities Observed within the Ojai Streams, is classification summary for predominant habitat types and their corresponding plant communities (series/alliances) observed in the field during the Ojai streams characterization and water quality sampling. The streams for which these plant communities were observed in are also indicated in Table 21. Please note that the Palustrine and Riverine systems generally refer to wetland habitats only. However, due to the highly disturbed nature of many stream reaches throughout Ojai (often successional habitats due to human impacts), and since all habitats observed were within the riparian zone of the Ojai streams, some plant communities typically considered upland habitats (i.e. California Annual Grassland Series and Coyote Brush Series) were encountered along the riparian zones throughout the City. Therefore, these more upland series are classified under the Cowardin (et al. 1979) classification that they were observed occupying.

**Table 21. Plant Communities Observed within the Ojai Streams**

Plant Series/Alliance or Aquatic Habitat Observed	Creek/Drainage Observed In													
	Arbo-lada	Ayers	Del Norte	Fox Canyon	Grand-view	Happy Valley	Oak	Ojai	Nordhoff	Post Office	San Antonio	Stewart Canyon	Thacher	Villa-nova
<b>Palustrine System (Riparian Habitats)</b>														
<i>Palustrine Emergent Wetland</i>														
<i>Cattail Series</i>		X	X						X		X			X
<i>Bulrush Series</i>			X					X	X		X	X		
<i>California Annual Grassland Series</i>	X		X						X		X	X		
<i>Ruderal Grassland Series</i>		X	X			X		X	X					
<i>Palustrine Scrub/Shrub Wetland</i>														
<i>Arroyo Willow Series</i>		X	X	X			X	X		X	X	X	X	X
<i>Mulefat Series</i>				X			X		X		X	X	X	X
<i>Giant Reed Series</i>			X	X							X	X		X
<i>Scalebroom Series</i>											X			
<i>Western Poison Oak-Pacific Blackberry Series</i>			X	X				X		X	X		X	X
<i>Coyote Brush Series</i>											X			X
<i>Palustrine Forested Wetland</i>														
<i>California Sycamore Series</i>		X		X				X		X	X	X	X	X
<i>Coast Live Oak Series</i>	X	X	X	X	X		X	X		X	X	X	X	X
<i>Eucalyptus Series</i>		X	X			X			X	X		X		
<i>Planted and Escaped Ornamentals</i>	X	X	X	X			X	X		X	X	X	X	X
<b>Riverine System (Aquatic Habitats)</b>														
<i>Riverine Lower Perennial Wetland</i>														
<i>Riverine Lower Perennial Unconsolidated Shore</i>											X	X		
<i>Riverine Lower Perennial Unconsolidated Bottom</i>											X	X		
<i>Riverine Lower Perennial Aquatic Bed (Duckweed Series)</i>				X		X		X	X		X	X		
<i>Riverine Intermittent Wetland</i>														
<i>Riverine Intermittent Streambed</i>	X	X	X	X	X	X	X	X	X	X		X	X	X

### ***Palustrine System (Riparian Habitats)***

The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergent plants, emergent mosses or lichens, and all such wetlands that occur in tidal areas, where salinity due to ocean-derived salts is below 0.5‰. This system is bounded by upland habitats or by any other system. The Palustrine system was developed to group the vegetated wetlands traditionally called such names as marshes, swamps, bogs, prairies, and ponds. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes. The erosive forces of wind and water are of minor importance except during severe floods. (Cowardin et al. 1979.)

#### **PALUSTRINE EMERGENT WETLAND**

Palustrine Emergent Wetlands are characterized by a dominance of erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation usually consists of perennial plants that are present for most or all of the growing season. Palustrine Emergent Wetlands are primarily bars and banks adjacent to Unconsolidated Bottom and Streambed Wetlands with at least a 30% cover by herbaceous vegetation. (Cowardin et al. 1979.) The plant series observed that are classified as Palustrine Emergent Wetland include: Cattail Series, Bulrush Series, California Annual Grassland Series, and Ruderal Grassland Series. Cattail Series and Bulrush Series are much more typical of Palustrine Emergent Wetland, while California Annual Grassland Series and Ruderal Grassland Series are generally more typical of upland habitats.

#### **Cattail Series**

Cattail Series is dominated by species of *Typha*, typically *T. latifolia* (Broad-leaved Cattail) and *T. domingensis* (Southern Cattail). The National List of Wetland Plants (Reed 1988) lists cattails as OBL (obligate wetland species), or almost always found growing in water or saturated soil. This plant community typically forms a thicket less than four meters tall, but also forms less dense patches scattered about. Cattail Series requires flooding and includes a variety of water chemistry - such as fresh, mixohaline, hyperhaline, mixosaline, and hypersaline - and it occurs from sea level to 2,000 meters in elevation. (Sawyer and Keeler-Wolf 1995.) Cattail Series was observed inhabiting predominantly the channels, creeks, and ditch-margins of the Ojai streams, and typically consisted only of small patches. Cattail Series was observed growing with associate species including *Cyperus eragrostis* (Umbrella Sedge), *Rorippa nasturtium-aquaticum* (Water Cress), *Schoenoplectus [Scirpus] californicus* (California Bulrush), and *Veronica anagallis-aquatica* (Common Speedwell).



**Photograph 22.** Del Norte Creek Reach 1, view north showing Cattail Series in the foreground (19 August 2004).

### **Bulrush Series**

Bulrush Series is dominated by *Schoenoplectus californicus* (California Bulrush). The National List of Wetland Plants (Reed 1988) also lists California Bulrush as an OBL species. Bulrush Series site requirements are very similar to those required by Cattail Series (described above). Bulrush Series occurs at elevations below 2,100 meters; it forms a variable (continuous to open), scrubby herbaceous layer of less than four meters tall; and it occurs in peaty, saturated soils of variably flooded and often ponded habitats with water chemistry requirements like those listed above in Cattail Series. (Sawyer and Keeler-Wolf 1995.) Bulrush Series observed throughout the Ojai streams was often intermixed with Cattail Series. Similar associates were generally observed in Cattail Series and Bulrush Series.

### **California Annual Grassland Series**

Although species composition varies among stands, alien and native annual grasses (genera including *Avena*, *Bromus*, *Hordeum*, *Lolium*, and *Vulpia*) typically dominate this plant community, while native wildflowers, naturalized annual forbs, and invasive exotics, are typically important contributors to the herbaceous cover of annual grassland. California Annual Grassland Series occurs on all topographic locations, especially gradual slopes, flats, coastal terraces, and in disturbed sandy sites; it typically grows in well-developed, deep, fine textured soils; and it occurs at elevations below 1,200 meters (Sawyer and Keeler-Wolf 1995). California Annual Grassland Series observed scattered throughout the Ojai streams exists as an understory growing below the riparian woodland habitats (or Palustrine Forested habitats [described below]), as well as in successional sites where riparian vegetation once predominated.



**Photograph 23.** Nordhoff Drain showing California Annual Grassland (5 January 2005).

The predominant nonnative annual grasses forming California Annual Grassland Series of the Ojai streams include *Avena barbata* (Slender Wild Oat), *Bromus diandrus*, *B. hordeaceus* (Soft Chess), *B. madritensis* ssp. *rubens* (Red Brome), *Hordeum murinum* ssp. *glaucum* (Summer Barley), and *Lolium multiflorum* (Italian Ryegrass). The nonnative perennial grasses observed onsite are *Cynodon dactylon* (Bermuda Grass) and *Piptatherum miliaceum* (Smilo Grass). The native herbaceous species recorded for California Annual Grassland Series include: *Ambrosia psilostachya* var. *californica* (Western Ragweed), *Conyza canadensis* (Common Horseweed), *Eremocarpus setigerus* (Dove Weed), *Heterotheca grandiflora* (Telegraph Weed), and *Verbena lasiostachys* (Western Verbena). Some of the naturalized, and often invasive, herbs scattered throughout California Annual Grassland Series include many of those listed below in Ruderal Grassland Series.

### Ruderal Grassland Series

Ruderal Grassland Series is not described by Sawyer and Keeler-Wolf (1995); however, this plant series is classified based on their protocols for classifying vegetation. Ruderal Grassland Series is typically in early successional stages due to severe human disturbance and/or recurrent natural disturbances. This plant community is dominated by herbaceous, introduced, pioneering plant species that readily colonize open disturbed soil and thrive as a result of human impacts. Ruderal communities may provide a certain degree of erosion control for recently disturbed or graded areas, but such communities are also a threat to the natural biodiversity. They continually distribute invasive, highly competitive, nonnative propagules into otherwise native vegetation; however, if ruderal grassland stands are not disturbed for more than five years, they can undergo succession towards more stable, and less weedy, plant communities such as coastal or riparian scrub. (Zedler et al. 1997.)



**Photograph 24.** Grandview-Park Drain showing Ruderal Grassland Series (27 May 2004).

Ruderal Grassland Series observed in the disturbed portions of the Ojai streams are most commonly predominated by *Hirschfeldia incana*, *Centaurea melitensis* (Tocalote), and *Picris echioides* (Bristly Ox-tongue). Some of the introduced, and often invasive, associate herbs scattered throughout Ruderal Grassland Series include: *Amaranthus albus* (Tumbleweed), *Anagallis arvensis* (Scarlet Pimpernel), *Carduus pycnocephalus* (Italian Thistle), *Foeniculum vulgare* (Sweet Fennel), *Lactuca serriola* (Prickly Wild Lettuce), *Marrubium vulgare* (White Horehound), *Medicago polymorpha* (Bur-clover), and *Sonchus oleraceus* (Common Sow-thistle).

### PALUSTRINE SCRUB/SHRUB WETLAND

Palustrine Scrub/Shrub Wetlands are one of the most widespread classes in the U.S. This habitat type includes areas dominated by woody, broad-leaved, deciduous plants less than six meters tall. The plant species of this wetland include true shrubs, young trees, and trees or shrubs that are small or stunted due to environmental conditions. Scrub/Shrub Wetlands may represent a successional stage leading to Forested Wetland, or may be relatively stable communities. All water regimes are included except subtidal. (Cowardin et al. 1979.)

Palustrine Scrub/Shrub Wetlands require at least seasonal flooding. These wetland types are predominated by shrubs located on bars and banks of river channels, and they form significant

riparian habitat in floodplain areas as well. Although this habitat is typically characterized by the presence of broad-leaved winter-deciduous shrubs, such as *Salix* spp. (willows), the floodplain areas may consist of several evergreen shrubs, such as *Baccharis salicifolia* (Mulefat). Invasive species, such as *Arundo donax* (Giant Reed - a large, shrub-sized, invasive, perennial grass), *Nicotiana glauca* (Tree Tobacco - an invasive tree-like shrub), *Ricinus communis* (a robust, shrub-sized, noxious and invasive perennial herb), and *Spartium junceum* (invasive shrub) create highly competitive conditions for other native riparian plant species within the Scrub/Shrub layer of the Palustrine system. The Palustrine Scrub/Shrub plant series observed in the field include Arroyo Willow Series, Mulefat Series, Giant Reed Series, Scalebroom Series, Western Poison Oak Series, and Coyote Brush Series, and these plant communities are discussed in the following paragraphs.

### Arroyo Willow Series

Arroyo Willow Series is a scrub community dominated by *Salix lasiolepis* (Arroyo Willow), which is a broad-leaved winter-deciduous large shrub to small tree. The National List of Wetland Plants (Reed 1988) lists *S. lasiolepis* as FACW, or a facultative wetland species that is usually found growing in water. Arroyo Willow has shiny dark green (upper surface) and white tomentose (lower surface) leaves. Arroyo Willow Series forms a continuous to intermittent tall shrub canopy with emergent trees. This plant community generally occurs in seasonally flooded and/or saturated, fresh water, wetland habitats, such as floodplains and low-gradient depositions along rivers and streams, at elevations between sea level and 1,800 meters (Sawyer and Keeler-Wolf 1995).



**Photograph 25.** San Antonio Creek showing old-growth Arroyo Willow Series (8 February 2005).

Predominant associate species observed contributing to the tall scrub canopy include the following: *Alnus rhombifolia* (White Alder), *Artemisia douglasiana* (Mugwort), *Baccharis salicifolia*, *Juglans californica* var. *californica* (Southern California Black Walnut), *Piptatherum miliaceum*, *Platanus racemosa* var. *racemosa* (California Sycamore), *Populus fremontii* ssp. *fremontii* (Fremont Cottonwood), *Prunus ilicifolia* (Holly-leaf Cherry), *Rosa californica* (California Wild Rose), *Rubus ursinus* (Pacific Blackberry), *Salix exigua* (Narrow-leaved Willow), and *Salix lucida* ssp. *lasiandra* (Shining Willow).

### Mulefat Series

Mulefat Series is dominated by *Baccharis salicifolia*, which is a tall, deciduous shrub with glabrous, sticky, bright green leaves. *B. salicifolia* has a wetland indicator status of FACW (Reed 1988). Mulefat Series forms a continuous shrub canopy less than four meters tall; it requires freshwater habitats that are seasonally flooded and saturated, such as canyon bottoms, irrigation ditches, and stream channels; and it is found at elevations between sea level and 1,250 meters (Sawyer and Keeler-Wolf 1995).



**Photograph 26.** Fox Canyon Barranca showing Mulefat Series (*Baccharis salicifolia*).

The general Mulefat Series plant communities observed throughout the Ojai streams are mixed stands that include important associate species such as *Artemisia douglasiana*, *Arundo donax* (Giant Reed), *Baccharis pilularis* (Coyote Brush), *Epilobium ciliatum* ssp. *ciliatum* (Northern Willow-herb), *Nicotiana glauca*, *Plantago lanceolata* (Lanceleaf Plantain), *Salix exigua*, *Salix lasiolepis*, *Typha domingensis*, and *Xanthium strumarium* (Cocklebur).

### Giant Reed Series

Giant Reed Series is dominated by the introduced, highly invasive *Arundo donax*. Giant Reed is a large, eight-meter-tall, perennial grass with thick rhizomes, and is native to Europe (Hickman 1993). The National Inventory of Wetland Plants (Reed 1988) lists this species as FACW. Giant Reed is an extremely invasive grass (introduced into California in the 1880's) that establishes and persists in riparian areas by reducing and replacing native species by establishing dense monocultures (Sawyer and Keeler-Wolf 1995). It is often described as forming an herbaceous layer based on its habit (perennial grass); however, it is categorized here as forming a scrub canopy due to the secondary vegetative stratum it creates.

Giant Reed Series consists of *A. donax* growing as the sole perennial grass forming a continuous scrubby canopy with few other species present. Giant Reed Series requires permanently saturated freshwater wetland habitats, with a shallow water table, at elevations below 500 meters. (Sawyer and Keeler-Wolf 1995.) Giant Reed Series was predominantly observed within the Ojai streams as large solitary thickets; however, *A. donax* also occurs as dense patches or individually scattered within other riparian communities. The scattered associate species observed growing with Giant Reed include *Baccharis pilularis*, *B. salicifolia*, *Foeniculum vulgare*, *Ricinus communis* (Castor Bean), *Salix lasiolepis*, *Schoenoplectus californicus*, *Piptatherum miliaceum*, and *Typha* spp. (cattails).

### **Scalebroom Series**

Scalebroom Series is dominated by *Lepidospartum squamatum*, which is a round-topped, woolly, broom-like native shrub (less than three meters tall) with scale-like leaves and yellow flowers. This species occurs in sandy or gravelly washes and stream terraces at elevations below 1,800 meters (Hickman 1993). Scalebroom is suggested to have a wetland indicator status of FACW (Magney 1992).

Scalebroom Series forms a continuous to intermittent canopy growing under emergent trees. The understory to Scalebroom Series is typically grassy or variable depending on hydrology. This series occurs in rarely flooded slopes and in low-gradient deposits along streams. Species composition differs greatly among Scalebroom stands, and disturbance may account for this high variation. (Sawyer and Keeler-Wolf 1995.) Magney (1992) further describes this series as Scalebroom Floodplain Scrub, which is a broad-leaved, phraetophytic, evergreen scrub type with *Artemisia californica* (California Sagebrush) and *Sambucus mexicana* (Blue Elderberry) as subdominant shrubs. This series is restricted to riverine cobbles, boulders, and sand of floodplain habitats (flooded every five to ten years), which is the driving force maintaining this phraetophytic vegetation type. Many upland species of Coastal Sage Scrub and chaparral communities become established in this streamside habitat.

Scalebroom Series was observed consisting of several associate species including *Ambrosia psilostachya* var. *californica*, *Artemisia californica*, *Baccharis pilularis*, *B. salicifolia*, *Bromus* spp. (brome grasses), *Hirschfeldia incana* (Summer Mustard), *Malosma laurina* (Laurelleaf Sumac), *Rosa californica*, *Solanum americanum* (White Nightshade), *Spartium junceum* (Spanish Broom), and *Toxicodendron diversilobum* (Western Poison Oak).

### **Western Poison Oak-Pacific Blackberry Series**

Western Poison Oak-Pacific Blackberry Series is co-dominated by *Toxicodendron diversilobum* and *Rubus ursinus*. Western Poison Oak is a deciduous shrub or perennial vine with ternate, reddish-green leaves and cream-colored berries. This plant is one of the most hazardous plants in California because the resinous leaves, stems, and fruit cause severe contact dermatitis. Western Poison Oak occurs in canyons and on slopes, and is a typical species of chaparral and oak woodland. This species occurs at elevations below 1,650 meters. Pacific Blackberry is a prickly, deciduous perennial vine or shrub with toothed, dark green leaves, white petals, and black berries. This species occurs in moist places, such as streamsides, at elevations below 1,500 meters. (Hickman 1993.)

Although Western Poison Oak-Pacific Blackberry Series is not described by Sawyer and Keeler-Wolf (1995), biologists observed and classified this plant community based on its co-dominance by these two species. The canopy formed by Western Poison Oak and Pacific Blackberry at many of the Ojai streams is typically less than two meters tall, intermittent to continuous, and often occurs as dense understory ground cover to Coast Live Oak Series. Western Poison Oak-Pacific Blackberry Series is generally very shaded and includes associate species such as *Artemisia douglasiana*, *Heteromeles arbutifolia* (Toyon), *Piptatherum miliaceum*, *Prunus ilicifolia*, *Rosa californica*, and *Vitis californica* (California Wild Grape).

### **Coyote Brush Series**

Coyote Brush Series is dominated by *Baccharis pilularis*, which is typically found in upland habitats, but was observed occupying much of the outer boundaries of the riparian zones throughout Ojai. Coyote Brush Series generally occurs in scrub and oak woodland communities on stabilized dunes of coastal bars, river mouths, coastline spits, coastal bluffs, open slopes with sometimes serpentine soils, and ecotonal areas with grasslands below 1,000 meters in elevation. This series forms a continuous

or intermittent canopy (less than two meters tall), growing over a variable ground layer. (Sawyer and Keeler-Wolf 1998.)

The associate shrub and herbaceous plant species observed as contributors to Coyote Brush Series include *Artemisia californica*, *Baccharis salicifolia*, *Ceanothus spinosus* (Greenbark Ceanothus), *Heteromeles arbutifolia*, *Lepidospartum squamatum* (Scalebroom), *Malosma laurina*, *Rumex crispus* (Curly Dock), *Sambucus mexicana*, *Solanum americanum*, and *Toxicodendron diversilobum*. Emergent *Quercus agrifolia* (Coast Live Oak) were also quite common in this plant series.

## **PALUSTRINE FORESTED WETLAND**

Palustrine Forested Wetlands are characterized by woody vegetation that is six meters tall or taller. Forested Wetlands only occur in the Palustrine and Estuarine systems and normally possess an overstory of trees, an understory of young trees and shrubs, and an herbaceous layer. Moisture must be relatively abundant, and wetlands in this subclass generally occur on mineral soils or highly decomposed organic soils. (Cowardin et al. 1979.)

Palustrine Forested Wetlands are important riparian plant communities as they provide suitable, structurally diverse, and often species-rich habitat for many species of wildlife that frequent and inhabit the streams of Ojai. Dominant trees that are typical of Palustrine Forested Wetland along the Ojai streams are predominantly broad-leaved winter-deciduous species. The plant communities classified under the Palustrine Forested Wetland class include California Sycamore Series and Coast Live Oak Series. These series are discussed in the following paragraphs.

It should be noted that the California Sycamore and Coast Live Oak woodland plant communities observed in the field are quite variable compared to how they are described by Sawyer and Keeler-Wolf (1995); however, these classifications fit most appropriately, and any differences are noted.

Also presented below is a description of Eucalyptus Series as observed during field surveys, as well as a discussion of other escaped ornamental and often highly invasive plant species that have become dominant in portions of the Ojai streams.

### **California Sycamore Series**

California Sycamore Series is dominated by the monoecious, wind-pollinated, broad-leaved winter-deciduous *Platanus racemosa*. This native tree has smooth, pale bark and large, densely hairy, palmate leaves. It is a common tree occurring along streamsides and in canyons (Hickman 1993). California Sycamore is listed with a wetland indicator status of FACW, or a facultative wetland species. (Reed 1988.)

California Sycamore Series grows in wetland soils, permanently saturated at depth, of freshwater riparian corridors, braided depositional channels of intermittent streams, gullies, springs, seeps, riverbanks, and terraces adjacent to floodplains subject to high-intensity seasonal flooding. This series also occurs on upland rocky canyon slopes, in alluvial, open cobbly, and rocky soils, at elevations below 2,400 meters. A shrubby thicket of evergreen and deciduous shrubs may grow below the 35-meter, widely spaced, sycamore canopy, and the ground layer is variable.



**Photograph 27.** Fox Canyon Barranca showing California Sycamore Series with oaks and willows, and showing influence of invasive exotic plant species (27 November 2004).

The California Sycamore Series plant communities observed during the streams characterization studies varied from stream to stream, and the important often co-dominant tree species observed contributing to the sycamore canopy include *Quercus agrifolia*, *Q. lobata* (Valley Oak), *Salix lasiolepis*, or *Populus fremontii* ssp. *fremontii*. Other associate tree species include: *Alnus rhombifolia*, *Fraxinus* sp. (Ash), *Juglans californica* var. *californica*, and *S. lucida* ssp. *lasiandra*. The shrub layer observed growing below the tree canopy is generally predominated by *Arundo donax*, *Baccharis salicifolia*, *Rosa californica*, *Rubus ursinus*, *S. exigua*, and *Sambucus mexicana*. Many of the introduced ornamental plant species, listed below in Planted and Escaped Ornamentals, were observed throughout California Sycamore Series. Many of the ornamental species have become invasive and are creating severely competitive condition for the native riparian plant species that are crucial to the survival of Steelhead Trout as well as other wildlife.

### **Coast Live Oak Series**

Coast Live Oak Series is dominated by *Quercus agrifolia* var. *agrifolia*, which is a broad-leaved, evergreen, broad-canopied tree with dark green leathery leaves. *Q. agrifolia* is the most widely distributed species of the evergreen oaks, and it is capable of achieving large size and old age. This oak typically occurs in valleys on predominantly north-facing slopes, along riparian woodland fringes, scattered in grassland or Coastal Sage Scrub communities, as an element of Mixed Evergreen Forest, or as a contributor to other oak woodlands (Zedler et al. 1997).

Coast Live Oak Series forms an intermittent, 30-meter-tall tree canopy growing over an understory of occasional shrubs and a grassy/herbaceous groundlayer. It also requires sandstone or shale-derived soils of elevations below 1,200 meters (Sawyer and Keeler-Wolf 1995). Coast Live Oak Series was observed in many riparian zones throughout the streams of Ojai. It is influenced by other adjacent plant series including California Sycamore Series, Arroyo Willow Series, and Coyote Brush Series.



**Photograph 28** (left). Upper end of Stewart Canyon Creek showing dense Coast Live Oak Series once continuous over the creek (28 January 2005). **Photograph 29** (right). Lower end of Stewart Canyon Creek showing an intermittent canopy (8 February 2005).

The native trees and large shrubs observed contributing to the oak canopy include *Juglans californica* var. *californica*, *Quercus lobata*, *Platanus racemosa*, *Salix lasiolepis*, and *Sambucus mexicana*. The shrub stratum growing below the oak canopy includes *Baccharis pilularis*, *Ceanothus spinosus*, *Heteromeles arbutifolia*, *Malosma laurina*, *Prunus ilicifolia* (Hollyleaf Cherry), *Rosa californica*, and *Toxicodendron diversilobum*. Many of the introduced ornamental plant species, listed below in Planted and Escaped Ornamentals, were observed throughout Coast Live Oak Series. The ornamental species are invasive and are creating severely competitive condition for the native riparian plant species that are crucial to the survival of Steelhead Trout as well as other wildlife.

### **Eucalyptus Series**

Eucalyptus Grove is dominated by *Eucalyptus globulus* var. *globules* (Tasmanian Blue Gum Eucalyptus) and/or *E. camaldulensis* (River Red Gum). These introduced, aromatic trees have a smooth straight trunk and are native to southeastern Australia. *E. globulus* is the most commonly cultivated and naturalized species of Eucalyptus in California (Hickman 1993), with *E. camaldulensis* also commonly planted. Eucalyptus Series (Sawyer and Keeler-Wolf 1995) forms a continuous canopy less than 50 meters tall with few other species present except infrequent shrubs growing over a sparse grassy ground layer. This series occurs on all slopes, and generally in disturbed areas, at elevations below 300 meters. The infrequent understory associate species of Eucalyptus Series observed within the watershed are *Arundo donax*, *Baccharis salicifolia*, *Platanus racemosa*, and *Washingtonia robusta* (Mexican Fan Palm). Although *E. globulus* is considered an escaped ornamental (further discussed below), this series is classified separately since it forms an almost pure stand with few associate species contributing to the canopy.

### **Planted and Escaped Ornamentals**

Planted and Escaped Ornamentals is classified here as a plant community since it includes those areas of the Ojai streams riparian zones that are highly disturbed due to human activities or influences, and include those areas dominated by, or that have been completely invaded by, introduced and often invasive plant species. This plant community often forms a nonnative woodland type habitat that exists as a result of planting introduced ornamental tree and shrub species for landscaping purposes. Since many residences have been constructed immediately adjacent to many portions of the Ojai streams riparian zones, the exotic species planted for landscaping readily escape and invade the native riparian plant communities. The ornamental species are much hardier than the native species and create significantly competitive conditions for those native riparian species. This type of plant community typically includes very few natives, but rather includes an array of ornamental species that have replaced the riparian plant communities.



**Photograph 30** (left). Nordhoff Drain and Happy Valley Drain confluence showing dense *Eucalyptus Series* in the background (15 January 2005). **Photograph 31** (right). Arbolada Creek showing how very little grows beneath *Eucalyptus Series* (30 September 2004).



**Photograph 32** (left). Arbolada Creek, view south showing planted ornamentals prohibiting the establishment of native riparian propagules (30 September 2004). **Photograph 33** (right). Fox Canyon Barranca along S. Montgomery Street showing dominance by escaped ornamentals such as Mexican Fan Palm (9 January 2005).

The predominant introduced trees and shrubs observed contributing to the plant communities dominated by ornamental species include: *Acacia* sp. (Acacia/Wattle), *Ailanthus altissima* (Tree-of-heaven), *Eucalyptus globulus*, *Ficus carica* (Fig), *Fraxinus* spp., *Hedera helix* (English Ivy), *Hirschfeldia incana*, *Mentha* spp. (Spearmint), *Nerium oleander* (Oleander), *Olea europea* (Olive), *Phoenix canariensis* (Canary Island Date Palm), *Plumbago ariculata* (Cape Plumbago), *Ipomoea* sp. (Morning-glory), *Schinus molle* (Peruvian Pepper Tree), *Vinca major* (Periwinkle), *Washingtonia robusta*, and *Yucca elephantipes* (Giant Yucca). The naturalized and invasive species observed frequently in these plant communities include *Arundo donax*, *Foeniculum vulgare*, *Nicotiana glauca*, *Piptatherum miliaceum*, and *Ricinus communis*. Native trees, including *Quercus agrifolia*, *Q. lobata*, and *Platanus racemosa* are also typically scattered throughout these areas of the Ojai streams.

### ***Riverine System (Aquatic Habitats)***

The Riverine system includes all wetlands and deepwater habitats contained within a channel (or a conduit periodically or continuously containing moving water, or forming a connecting link between two bodies of water), with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens; and (2) habitats with water containing ocean-derived salts in

excess of 0.5‰. The Riverine system is bounded on the landward side by the channel bank, or by wetland dominated by trees, shrubs, and persistent emergents. Water is usually, but not always, flowing in this system. (Cowardin et al. 1979.) The Riverine system is classified into two subsystems for the streams of Ojai: Lower Perennial and Intermittent.

## **RIVERINE LOWER PERENNIAL WETLAND**

The Riverine Lower Perennial subsystem includes habitats where the gradient is low and water velocity is slow. No tidal influence exists, and some water flows throughout the year. The substrate consists of mainly sand and mud. Oxygen deficits may occur, the fauna is composed of species that reach their maximum abundance in still water, and true planktonic organisms are common. The gradient is lower than that of the Upper Perennial system, and the floodplain is well developed. (Cowardin et al. 1979.) The three general classes observed during the Ojai streams field surveys include Unconsolidated Shore, Unconsolidated Bottom, and Aquatic Bed, which are discussed below.

### **Riverine Lower Perennial Unconsolidated Shore Wetland**

Riverine Lower Perennial Unconsolidated Shore includes all wetland habitats having three characteristics: unconsolidated substrates with less than 75% aerial cover of stones, boulders, or bedrock; having less than 30% aerial cover of vegetation other than pioneering plants; and having almost any particular flooding water regime. This habitat is characterized by substrates lacking vegetation except the pioneering plants that become established during brief periods when growing conditions are favorable. Erosion and deposition by waves and currents in this system produce landforms such as beaches, bars, and flats. Unconsolidated Shore is typically found adjacent to Unconsolidated Bottom in all systems, and particle size of the substrate and the water regime are the important factors determining types of plant/animal communities present. (Cowardin et al. 1979.)

Boulders, stones, and gravel were observed as predominant substrate types within the Riverine Lower Perennial Unconsolidated Bottom Wetland habitats of the Ojai streams. The scattered pioneering plants observed in this habitat include *Epilobium ciliatum* ssp. *ciliatum*, *Hirschfeldia incana*, *Melilotus alba* (White Sweetclover), *Plantago lanceolata*, *Polypogon monspeliensis* (Rabbitsfoot Grass), and *Xanthium strumarium*.

### **Riverine Lower Perennial Unconsolidated Bottom Wetland**

Riverine Lower Perennial Unconsolidated Bottom includes habitats with at least 25% cover of particles smaller than stones, and a vegetative cover less than 30%. Water regimes are restricted to subtidal (not present at the project site), permanently flooded, intermittently exposed, and semipermanently flooded. This class is characterized by the lack of large stable surfaces for plant and animal attachment. Exposure to wave and current action, temperature, salinity, and light penetration determine the composition and distribution of organisms. Most animals in unconsolidated sediments live within the substrate, while some maintain permanent burrows, and others may live on the surface. Unconsolidated Bottom is usually found in areas with lower energy than Rock Bottoms, and may be very unstable. In the Riverine System, the substrate type of this class is largely determined by current velocity, and plants and animals exhibit a high degree of morphologic and behavioral adaptation to flowing water. (Cowardin et al. 1979.)

Cobble, gravel, and sand were observed as predominant substrate types within the Riverine Lower Perennial Unconsolidated Bottom of portions of the Ojai streams. Scattered plants species include most of those mentions above in Unconsolidated Shore.

### **Riverine Lower Perennial Aquatic Bed Wetland (Duckweed Series)**

Riverine Lower Perennial Aquatic Bed Wetland includes habitat dominated by plants that grow on or below the water surface for most of the growing season. Aquatic Beds represent a diverse group of plant communities that require surface water for optimum growth and reproduction (Cowardin et al. 1979). This habitat class is characterized by seasonally or permanently flooded freshwater channel/bed that is dominated by floating or attached vascular aquatic plants.

The Aquatic Bed plant series classified here based on field surveys is Duckweed Series, which is dominated by species of *Lemna* spp. (Duckweed). Duckweed species are free-floating, aquatic herbs with flat, oblong, bright green, small plant bodies (often joined or paired) with a single root. The common associate (or co-dominant) to Duckweed observed inhabiting ponded water in the Ojai streams is *Azolla filiculoides* (Mosquito Fern). Mosquito Fern is also free-floating, but is a fan-shaped, greenish-red, scaly, aquatic fern. These annual plants are typically present in quiet water during the warm summer months. (Hickman 1993.)

### **RIVERINE INTERMITTENT WETLAND**

The Riverine Intermittent subsystem exists where the channel contains nontidal flowing water for only part of the year. When active flows are not present, surface water may be absent or water may remain in isolated pools. (Cowardin et al. 1979.) The areas of the Ojai streams, where water was not present during the time of the surveys and where the substrate was not dominated by vegetation, are classified as Riverine Intermittent Wetland.

### **Riverine Intermittent Streambed Wetland**

The Streambed class includes all wetlands contained within the Intermittent Subsystem of the Riverine system. Riverine Intermittent Streambed varies greatly in substrate and form depending on the gradient of the channel, velocity of the water, and sediment load. The substrate material frequently changes abruptly between riffles and pools, and complex patterns of bars may form on the convex side of single channels or be included as islands within the bed of braided streams. In most cases, streambeds are not vegetated because of the scouring effect when moving water is present, but like Unconsolidated Shore, they may be colonized by pioneering annuals and perennials during periods of low flows, or they may be too scattered to qualify as an Emergent or Scrub/Shrub Wetland. (Cowardin et al. 1979.)

All non-active, unvegetated, primary channels and secondary drainages with no flows at the time of the surveys, are classified as Riverine Intermittent Streambed. The substrate varied from boulders, stones, and cobbles to stones, cobbles, and gravel with patches of sand. Scattered pioneering annual and perennial herbs include: *Conyza canadensis*, *Hirschfeldia incana*, *Melilotus alba*, *Sonchus oleraceus*, and *Xanthium strumarium*.

## **Wildlife**

Biologists conducted cursory wildlife surveys at each Water Quality Sampling Station; performed a nighttime cursory wildlife survey in Fox Canyon, Ojai, and Stewart Canyon Creeks; and reported all observed wildlife during the Ojai streams characterization study. The following subsections present the findings of those surveys.

## *Fauna*

Numerous wildlife species are known to occur within the Ventura River system, as well as the streams (the tributaries of the Ventura River) that run directly through the City of Ojai. Wildlife frequent the Palustrine System and Riverine System habitats on a seasonal basis and/or regularly use resources provided by the streams of the Ventura River system. Table 22, Wildlife Species of the City of Ojai and Ojai Basin Streams, contains a list of animal species that are known and expected to be associated with creeks and drainages of Ojai. This table is a compilation of (1) the cursory daytime wildlife surveys conducted at each Water Quality Sampling Station, (2) the cursory nighttime wildlife survey (discussed in the following paragraph), (3) all observed wildlife during the Ojai Basin streams characterization study, and (4) any reported wildlife for the area.

### *Wildlife Survey Results*

Biologists conducted cursory wildlife surveys at each Water Quality Sampling Station and performed a nighttime cursory wildlife survey in Fox Canyon, Ojai, and Stewart Canyon Creeks. These survey results are presented below as Table 23, Summary of Wildlife Surveys Conducted in the Ojai Streams, which indicates the date and time that each creek was surveyed, the general habitat type surveyed and dominant plant species observed, the wildlife observed, whether or not flows were present in each creek surveyed, and any creek modifications.



*Wildlife observed during the Fox Canyon Barranca night survey. **Photograph 34** (top left) Matilija Shoulderband Snail (*Helminthoglypa willetti*). **Photograph 35** (top right) Black-bellied Slender Salamander. **Photograph 36** (lower left) Spiders, including female Black Widow. **Photograph 37** (lower right) Beetle larvae. Photos taken 6 December 2004.*

**Table 22. Wildlife Species of the City of Ojai and Ojai Basin Streams**

Scientific Name <sup>16</sup>	Common Name	Habitat	Evidence <sup>17</sup>
<i>Fish</i>			
<i>Cottus asper</i>	Prickly Sculpin	Riverine Aquatic Bed	Observed
<i>Gasterosteus aculeatus microcephalus</i>	Partially Armored Threespine Stickleback	Riverine Aquatic Bed	Observed
<i>Pimephales promelas</i> *	Fathead Minnow	Riverine Aquatic Bed	Observed
<i>Gila orcutti</i>	Arroyo Chub	Riverine Aquatic Bed	Observed
<i>Lepomis cyanellus</i> *	Green Sunfish	Riverine Aquatic Bed	Observed
<i>Gambusia affinis</i> *	Mosquitofish	Riverine Aquatic Bed	Observed
<i>Ictalurus punctatus</i> *	Channel Catfish	Riverine Aquatic Bed	Reported
<i>Cyprinus carpio</i> *	Carp	Riverine Aquatic Bed	Reported
<i>Carassius auratus</i> *	Goldfish	Riverine Aquatic Bed	Observed
<i>Lampetra tridentata</i>	Pacific Lamprey	Riverine Aquatic Bed	Reported
<i>Oncorhynchus mykiss</i>	Southern Steelhead (Southern California ESU - Federally Listed as Endangered)	Riverine Aquatic Bed	Observed
<i>Oncorhynchus mykiss</i> <sup>18</sup>	Rainbow Trout	Riverine Aquatic Bed	Observed
<i>Amphibians</i>			
<i>Batrachoseps nigriventris</i>	Black-bellied Slender Salamander	Riverine Aquatic Bed, Palustrine	Observed
<i>Bufo boreas halophilus</i>	California Toad	Riverine Aquatic Bed, Palustrine	Expected
<i>Hyla regilla</i>	Pacific Treefrog	Riverine Aquatic Bed, Palustrine	Observed
<i>Rana catesbiana</i> *	Bullfrog	Riverine Aquatic Bed, Palustrine	Observed
<i>Reptiles</i>			
<i>Clemmys marmorata pallida</i>	Southwestern Pond Turtle (CDFG Species of Special Concern)	Riverine Aquatic Bed, Palustrine	Expected
<i>Elgaria multicarinatus</i>	San Diego Alligator Lizard	Palustrine	Observed
<i>Sceloporous occidentalis</i>	Western Fence Lizard	Palustrine	Observed
<i>Uta stansburiana elegans</i>	Side-blotched Lizard	Palustrine	Observed
<i>Pituophis melanoleucus annectens</i>	San Diego Gopher Snake	Palustrine	Expected
<i>Pituophis melanoleucus</i>	Gopher Snake	Riverine Aquatic Bed, Palustrine	Expected
<i>Thamnophis couchi</i>	Western Aquatic Garter Snake	Riverine Aquatic Bed, Palustrine	Expected
<i>Lampropeltis getulus californiae</i>	California Kingsnake	Palustrine	Reported
<i>Crotalus viridis</i>	Western Rattlesnake	Palustrine	Expected
<i>Avifauna</i>			
<i>Ardea herodias</i>	Great Blue Heron	Riverine Aquatic Bed, Palustrine	Observed
<i>Ardea alba</i>	Great Egret	Riverine Aquatic Bed, Palustrine	Observed
<i>Egretta thula</i>	Snowy Egret	Palustrine	Observed
<i>Butorides virescens</i>	Green Heron	Palustrine	Reported
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	Riverine Aquatic Bed, Palustrine	Observed

<sup>16</sup> An asterisk "\*" after the scientific name indicated non-native species.

<sup>17</sup> Reported fish species are based on findings by Hunt (1991). Reported bird species are reported as being observed in October 2004 at the Ojai Meadows Preserve by Jon Diegas, while nomenclature follows National Geographic (2002).

<sup>18</sup> Rainbow Trout are treated separately to indicate those fish that lack access to the ocean, and not considered Southern Steelhead.

**Table 22. Wildlife Species of the City of Ojai and Ojai Basin Streams (continued)**

Scientific Name	Common Name	Habitat	Evidence
<i>Avifauna (continued)</i>			
<i>Anas platyrhynchos</i>	Mallard	Riverine Aquatic Bed, Palustrine	Observed
<i>Fulica americana</i>	American Coot	Riverine Aquatic Bed, Palustrine	Expected
<i>Cathartes aura</i>	Turkey Vulture	Palustrine	Observed
<i>Callipepla californica</i>	California Quail	Palustrine	Observed
<i>Mergus merganser</i>	Common Merganser	Palustrine	Reported
<i>Accipiter cooperii</i>	Cooper's Hawk	Palustrine	Observed
<i>Buteo lineatus</i>	Red-shouldered Hawk	Palustrine	Observed
<i>Buteo jamaicensis</i>	Red-tailed Hawk	Palustrine	Observed
<i>Falco sparverius</i>	American Kestrel	Palustrine	Observed
<i>Falco columbarius</i>	Merlin	Palustrine	Reported
<i>Charadrius vociferus</i>	Killdeer	Riverine Intermittent Streambed	Observed
<i>Zenaida macroura</i>	Mourning Dove	Palustrine	Observed
<i>Calypte anna</i>	Anna's Hummingbird	Palustrine	Observed
<i>Ceryle alcyon</i>	Belted Kingfisher	Riverine Aquatic Bed, Palustrine	Reported
<i>Melanerpes formicivorus</i>	Acorn Woodpecker	Palustrine	Observed
<i>Picoides pubescens</i>	Downy Woodpecker	Palustrine	Expected
<i>Picoides villosus</i>	Hairy Woodpecker	Palustrine	Expected
<i>Picoides nuttallii</i>	Nuttall's Woodpecker	Palustrine	Reported
<i>Colaptes auratus</i>	Northern Flicker	Palustrine	Observed
<i>Empidonax difficilis</i>	Pacific-slope [Western] Flycatcher	Palustrine	Expected
<i>Sayornis nigricans</i>	Black Phoebe	Palustrine	Observed
<i>Sayornis saya</i>	Say's Phoebe	Palustrine	Reported
<i>Tyrannus vociferans</i>	Cassin's Kingbird	Palustrine	Reported
<i>Aphelocoma californica</i>	Western Scrub-jay	Palustrine	Observed
<i>Corvus caurinus</i>	American Crow	Palustrine	Observed
<i>Corvus corax</i>	Common Raven	Palustrine	Observed
<i>Eremophila alpestris</i>	Horned Lark	Palustrine	Reported
<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	Riverine Aquatic Bed, Palustrine	Observed
<i>Hirundo rustica</i>	Barn Swallow	Palustrine	Observed
<i>Baeolophus inornatus</i>	Oak Titmouse	Palustrine	Observed
<i>Psaltriparus minimus</i>	Common Bushtit	Palustrine	Observed
<i>Thryomanes bewickii</i>	Bewick's Wren	Palustrine	Reported
<i>Troglodytes aedon</i>	House Wren	Palustrine	Reported
<i>Sialia mexicana</i>	Western Bluebird	Palustrine	Observed
<i>Mimus polyglottos</i>	Northern Mockingbird	Palustrine	Observed
<i>Sturnus vulgaris</i> *	European Starling	Palustrine	Observed
<i>Vermivora celata</i>	Orange-crowned Warbler	Palustrine	Reported
<i>Dendroica petechia</i>	Yellow Warbler	Palustrine	Reported
<i>Geothlypis trichas</i>	Common Yellowthroat	Palustrine	Reported
<i>Pipilo crissalis</i>	California Towhee	Palustrine	Observed
<i>Chondestes grammacus</i>	Lark Sparrow	Palustrine	Reported
<i>Passerculus sandwichensis</i>	Savannah Sparrow	Palustrine	Reported
<i>Melospiza melodia</i>	Song Sparrow	Palustrine	Reported
<i>Melospiza lincolni</i>	Lincoln's Sparrow	Palustrine	Reported
<i>Zonotrichia leucophrys</i>	White-crowned Sparrow	Palustrine	Observed

**Table 22. Wildlife Species of the City of Ojai and Ojai Basin Streams (continued)**

Scientific Name	Common Name	Habitat	Evidence
<i>Avifauna (continued)</i>			
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	Palustrine	Observed
<i>Agelaius tricolor</i>	Tricolored Blackbird (State Listed as Threatened)	Palustrine	Reported
<i>Sturnella neglecta</i>	Western Meadowlark	Palustrine	Reported
<i>Euphagus cyanocephalus</i>	Brewer's Blackbird	Palustrine	Observed
<i>Molothrus ater</i>	Brown-headed Cowbird	Palustrine	Reported
<i>Carpodacus cassinii</i>	House Finch	Palustrine	Observed
<i>Carduelis psaltria</i>	Lesser Goldfinch	Palustrine	Reported
<i>Carduelis tristis</i>	American Goldfinch	Palustrine	Observed
<i>Carduelis lawrencei</i>	Lawrence's Gold finch	Palustrine	Reported
<i>Mammals</i>			
<i>Didelphis virginiana</i>	Virginia Opossum	Palustrine	Observed
<i>Scapanus townsendii</i>	Townsend's Mole	Palustrine	Expected
<i>Mustela frenata</i>	Long-tailed Weasel	Palustrine	Expected
<i>Spermophilus beecheyi</i>	California Ground Squirrel	Palustrine	Observed
<i>Sciurus niger</i> *	Eastern Fox Squirrel	Palustrine	Observed
<i>Thomomys bottae</i>	Botta's Pocket Gopher	Palustrine	Observed
<i>Peromyscus maniculatus</i>	Deer Mouse	Palustrine	Observed
<i>Neotoma fuscipes</i>	Dusky-footed Woodrat	Palustrine	Expected
<i>Microtus californicus</i>	California Vole	Palustrine	Expected
<i>Rattus rattus</i> *	Black Rat	Palustrine	Observed
<i>Canis latrans</i>	Coyote	Palustrine	Observed
<i>Urocyon cinereoargenteus</i>	Gray Fox	Palustrine	Observed scat & tracks
<i>Ursus americanus</i>	Black Bear	Palustrine	Expected
<i>Procyon lotor</i>	Raccoon	Riverine Aquatic Bed, Palustrine	Observed
<i>Spilogale gracilis</i>	Western Spotted Skunk	Palustrine	Expected
<i>Mephitis mephitis</i>	Striped Skunk	Palustrine	Observed
<i>Felis concolor</i>	Mountain Lion	Palustrine	Expected
<i>Lynx rufus</i>	Bobcat	Palustrine	Observed scat & tracks
<i>Odocoileus hemionus</i>	Mule Deer	Palustrine	Observed scat & tracks
<i>Invertebrates</i>			
<i>Helminthoglypta phlyctaena</i>	Zaca Shoulderband Snail	Palustrine	Expected
<i>Helminthoglypta willetti</i>	Matilija Shoulderband Snail	Palustrine	Expected/Observed
<i>Deroceras reticulatum</i> *	Reticulated Slug	Palustrine, landscaping	Expected
<i>Haplotrema caelatum</i>	Slotted Lancetooth Snail	Palustrine	Expected
<i>Helix aspersa</i> *	European Garden Snail	Palustrine, ruderal	Observed
<i>Lehmannia valentiana</i> *	Threeband Gardenslug Snail	Ruderal/landscaping	Expected
<i>Limax flavus</i> *	Yellow Gardenslug Snail	Ruderal/landscaping	Expected
<i>Milax gagates</i> *	Black-keeled Slug	Ruderal/landscaping	Expected
<i>Lumbricus terrestris</i>	Earth Worm	Palustrine	Observed
Astacidae*	Crayfish	Riverine	Observed
Arneida	Black Widow Spider	Palustrine	Observed
<i>Hydrobius fuscipes</i>	Water Scavenger Beetle	Riverine	Observed
<i>Gerris remigis</i>	Water Strider	Riverine	Observed
<i>Notonecta undulata</i>	Backswimmer	Riverine	Observed
Culicidae	Mosquito	Riverine	Observed
<i>Danus plexippus</i>	Monarch Butterfly	Palustrine	Observed
<i>Apis mellifera</i> *	European Honey Bee	Palustrine	Observed

**Table 23. Summary of Wildlife Surveys Conducted in the Ojai Streams**

Reach No.	Date	Time	Stream Name	Habitat Type	Predominant Plant Species	Wildlife Observed	Inundated	Modifications
1	3-Dec-04	10:30 AM	Happy Valley Drain	Riverine Intermittent Streambed	Eucalyptus	House Finch American Goldfinch Warblers in Eucalyptus trees	No	Unnatural drainage, Eucalyptus grove
2	3-Dec-04	11:30 AM	Villanova Creek	Palustrine Forested	Arroyo Willow Mulefat California Sycamore	House Finch in Arroyo Willow canopy	Yes	Rock banks holding road shoulder
3	3-Dec-04	12:20 PM	Del Norte Creek	Palustrine Forested	Coast Live Oak California Sycamore	None	Yes	Rock/cement banks
4	9-Dec-04	10:30 AM	San Antonio Creek	Palustrine Scrub/Shrub	Arroyo Willow Giant Reed	None	Yes	Bridge and unnatural rock/cement spillway
5	9-Dec-04	12:25 AM	San Antonio Creek	Palustrine Scrub/Shrub	Giant Reed Pacific Blackberry	Western Scrub-jay in Fremont Cottonwood canopy	Yes	Giant Reed infestation
	5-Dec-04	11:05 PM	San Antonio Creek	Riverine Lower Perennial	Coast Live Oak, California Sycamore, Giant Reed	Mosquito Fish Crawfish	Yes	Narrow bridge with concrete spillway upstream
6	9-Dec-04	1:00 PM	Stewart Canyon Creek	Palustrine Forested	Coast Live Oak California Bay Arroyo Willow	Southern Steelhead (~12")	Yes	Metal retaining wall holding road shoulder
7	9-Dec-04	1:35 PM	Ojai Creek	Palustrine Forested	Coast Live Oak Southern California Black Walnut California Bay California Sycamore	Pacific Treefrogs Common Bushtit in Coast Live Oak	Yes	Libbey Park adjacent to riparian zone
	5-Dec-04	10:10 PM	Ojai Creek	Riverine Intermittent Streambed	Coast Live Oak Morning-glory Mexican Fan Palm English Ivy	Matilija Shoulderband Snail Mosquito Fish Watercress 2 Pacific Treefrogs Crawfish	Yes	Libbey Park Adjacent to drainage
8	9-Dec-04	2:10 PM	Fox Canyon Barranca	Palustrine Forested	Mature Coast Live Oak overstory	Western Scrub-jays; Warblers in Coast Live Oak trees	Yes	Bridge, wooden fences fragmenting wildlife
	5-Dec-04	8:50 PM	Fox Canyon Barranca	Palustrine Forested	Coast Live Oak English Ivy	2 Slender Salamanders Land Snail in rocks above culvert	No	Culvert directing water under road through residential area
9	7-Dec-04	11:00 AM	Arbolada Creek	Palustrine Forested, Unnatural	Coast Live Oak Toyon Mexican Fan Palm	None	No	River rock spillway used to direct water under roadways
10	7-Dec-04	12:00 PM	Stewart Canyon Creek	Palustrine Forested	California Sycamore Greenbark Ceanothus Laurel Sumac	Western Scrub-jays	No	Residential exotics carried by water transport (palms, eucalyptus)
	5-Dec-04	9:40 PM	Stewart Canyon Creek	Palustrine Scrub/Shrub	Mulefat Arroyo Willow Laurel Sumac	None	No	Debris basin below site
11	7-Dec-04	2:00 PM	Ayers Creek	Palustrine Scrub/Shrub	Inundated with Mexican Fan Palm	None	Yes	Soule Park Golf Course to west

**Table 23. Summary of Wildlife Surveys Conducted in the Ojai Streams (continued)**

Reach No.	Date	Time	Stream Name	Habitat Type	Predominant Plant Species	Wildlife Observed	Inundated	Modifications
12	8-Dec-04	11:00 AM	San Antonio Creek	Palustrine Scrub/Shrub	Mulefat Arroyo Willow Laurel Sumac	Small songbirds Warblers under Mulefat	No	Trash accumulated under bridge
13	8-Dec-04	11:45 AM	Thatcher Creek	Palustrine Forested	Coast Live Oak Arroyo Willow Fremont Cottonwood	Juvenile Red-tail Hawk Adult Red-tail Hawk Acorn Woodpecker Pacific Treefrogs	No	Concrete banks, concrete tunnel under bridge with 3-ft. drop in spillway
14	8-Dec-04	1:30 PM	Fox Canyon Creek	Palustrine Forested	Coast Live Oak Mexican Fan Palm Morning-glory Pacific Blackberry	None	Yes	Concrete spillway, trash from athletics club, tennis balls
15	8-Dec-04	2:45 PM	Stewart Canyon Creek	Palustrine Scrub/Shrub	Spanish Broom Eucalyptus Yellow Star-thistle	2 Mallard Ducks Pacific Treefrogs	Yes	Mostly cement and rock banks
16	8-Dec-04	3:30 PM	Arbolada Creek	Palustrine Forested	Coast Live Oak	Small songbirds in residential trees	No	Residential area
17	8-Dec-04	4:10 PM	Del Norte Creek	Palustrine Forested, Unnatural	Eucalyptus Mexican Fan Palm Oleander (residential)	Acorn Woodpecker in California Sycamore	Yes	Rock/cement bank holding road shoulder
18	9-Dec-04	2:45 PM	Del Norte Creek	Palustrine Forested	Eucalyptus Coast Live Oak	Pacific Treefrog Acorn Woodpecker California Quail	Yes	Ojai Valley Inn Golf Course surrounds the drainage

### *Wildlife Habitats*

Palustrine (riparian) and Riverine (aquatic) habitats contain numerous attributes and resources that are important for wildlife. The structure diversity of the riparian community, in addition to the high plant species richness, provides necessary foraging, nesting, and cover resources and opportunities for numerous species. Aquatic habitats are important sources of water for many wildlife species occupying upland habitats that frequent the streams specifically for water. The following subsections discuss some of the common species of fish, amphibians, reptiles, birds, and mammals that inhabit and/or frequent the riparian and aquatic habitats of the Ojai Basin streams and the San Antonio Creek Watershed.

#### **RIPARIAN**

The riparian zone is the vegetative corridor at the boundary of a body of water. It is often unique from the surrounding vegetation due to its proximity to water, and it acts as the interface between the terrestrial and aquatic zones. Riparian zones are frequently habitat for endangered and threatened species, including the Least Bell's Vireo and the Tiger Salamander. During the dry season, the riparian areas around a stream will be the only areas with green plant growth. Riparian areas are often the only home for deciduous trees, like sycamores and willows, which need year-round water to survive. Overhanging trees help to preserve threatened species like Steelhead Trout by providing shade and cool water. Riparian areas provide protected habitat and migration/travel corridors for much of the area's wildlife. These migration corridors can act as connections between habitat patches, and they allow for physical and genetic exchange between animal populations. Wildlife can use riparian zones for cover while traveling across otherwise open landscapes. Some studies have shown that as much as 85% of a region's wildlife inhabit riparian zones at some point in their life.

By preventing erosion, riparian plants keep water silt-free for trout eggs to hatch, and by providing shade, the stream temperatures stay cool enough for the spawn to survive. Riparian areas also serve as a buffer between land-use and the stream; they filter out pollutants before they reach the water and act as a bacteriological and chemical factory to cleanse stream water as it moves to and from the channel and stream bank. (Leydecker and Grabowsky 2004.)

The general riparian wildlife habitats discussed below are those of the Palustrine System, including Emergent Wetland (herbaceous), Scrub/Shrub Wetland (dominated by shrubs), and Forested Wetland (created by a tree canopy) (Cowardin et al. 1979). These habitat types are floristically described in detail in the Palustrine System subsection of this report.

**Palustrine Emergent Wetland**, or Freshwater Marsh, habitats provide escape, nesting, and thermal cover for a variety of mammals, birds, amphibians, and invertebrates. Species of wildlife that are expected to frequent Freshwater Marsh habitat for foraging purposes include the following: aquatic snails (family *Gastropoda*), Pacific Treefrog (*Hyla regilla*), Black-bellied Slender Salamander (*Batrachoseps nigriventris*), Gopher Snake (*Pituophis melanoleucus*), Western Aquatic Garter Snake (*Thamnophis couchi*), Common Raven (*Corvus corax*), Great Blue Heron and Great Egret (*Ardea* spp.), Green Heron (*Butorides virescens*), Black-crowned Night Heron (*Nycticorax nycticorax*), Snowy Egret (*Egretta thula*), Mallard (*Anas platyrhynchos*), Coyote (*Canis latrans*), Raccoon (*Procyon lotor*), and Mule Deer (*Odocoileus hemionus*).

Freshwater Marsh communities can also provide suitable foraging and cover habitat for the Southwestern Pond Turtle (*Clemmys marmorata pallida*), a State- and Federally-designated Species of Special Concern; however, none have been observed during this study. This species prefers quiet waters of ponds, small lakes, streams, and marshes. It is found to inhabit the largest and deepest pools along streams with large amounts of basking sites, including fallen trees and boulders. Pond turtles also congregate in areas of streams with abundant underwater cover or places of escape beneath the water surface such as undercut banks, tangles of roots, and submerged logs (Hunt 1994).

Many reptiles use **Palustrine Scrub/Shrub** habitats for foraging purposes and for cover. Various reptiles that are known in the streams of Ojai, or that are expected to occur based on the presence of suitable habitats, include: San Diego Alligator Lizard (*Elgaria multicarinatus*), Western Fence Lizard (*Sceloporus occidentalis*), Side-blotched Lizard (*Uta stansburiana elegans*), California Kingsnake (*Lampropeltis getulus californiae*), and San Diego Gopher Snake (*Pituophis melanoleucus annectens*).

Birds that commonly frequent and inhabit scrub/shrub riparian habitats of the San Antonio Creek Watershed and its tributaries include: California Quail (*Callipepla californica*), Mourning Dove (*Zenaida macroura*), Anna's Hummingbird (*Calypte anna*), Pacific-slope [Western] Flycatcher (*Empidonax difficilis*), Black Phoebe (*Sayornis nigricans*), Say's Phoebe (*Sayornis saya*), Western Scrub-jay (*Aphelocoma californica*), American Crow (*Corvus caurinus*), Oak Titmouse (*Baeolophus inornatus*), Common Bushtit (*Psaltriparus minimus*), Common Yellowthroat (*Geothlypis trichas*), California Towhee (*Pipilo crissalis*), White-crowned Sparrow (*Zonotrichia leucophrys*), Red-winged Blackbird (*Agelaius phoeniceus*), Brewer's Blackbird (*Euphagus cyanocephalus*), House Finch (*Carpodacus cassinii*), and American Goldfinch (*Carduelis tristis*).

Many mammals are also closely associated with scrub/shrub riparian habitats of the San Antonio Creek Watershed and Ojai Basin streams. Several species will establish dens or burrows in areas of the riparian community, where understory growth is dense and food is readily available. Mammals that frequent and inhabit the riparian scrub habitats of the Ojai streams include: Virginia Opossum (*Didelphis virginiana*), Townsend's Mole (*Scapanus townsendii*), California Ground Squirrel

(*Spermophilus beecheyi*), Botta's Pocket Gopher (*Thomomys bottae*), Deer Mouse (*Peromyscus maniculatus*), Dusky-footed Woodrat (*Neotoma fuscipes*), Black Rat (*Rattus rattus*), Coyote, Gray Fox (*Urocyon cinereoargenteus*), Raccoon, and Striped Skunk (*Mephitis mephitis*).

Vegetation associated with **Palustrine Forested Wetland** may provide roosting and foraging habitat for various migratory bird species. In addition, many migratory bird species are dependent upon riparian communities such as Riparian Forest for overwintering habitat. Larger trees within the riparian zone often provide important roosting and nesting areas for numerous large birds, including Turkey Vulture (*Cathartes aura*), Western Scrub-jay, Cooper's Hawk (*Accipiter cooperi*), Red-shouldered Hawk (*Buteo lineatus*), and Red-tailed Hawk (*Buteo jamaicensis*). Dead trees and snags of California Sycamore, willows, cottonwoods, oaks, and White Alder provide essential habitat for a large number of cavity nesters including American Kestrel, Northern Flicker (*Colaptes cafer*), Downy and Hairy Woodpeckers (*Picoides* spp.), and Acorn Woodpecker (*Melanerpes formicivorus*). Additional bird species observed and expected to frequent or inhabit the Palustrine Forested Wetlands of the Ojai streams include: Western Meadowlark (*Sturnella neglecta*), Black Phoebe, Mourning Dove (*Zenaida macroura*), Pacific-slope Flycatcher, Cassin's Kingbird (*Tyrannus vociferans*), Common Raven, Western Bluebird (*Sialia mexicana*), and Northern Mockingbird (*Mimus polyglottos*).

Other vertebrate species that are expected to use Riparian Forest habitat for cover or foraging purposes include Pacific Treefrog, California Toad (*Bufo boreas halophilus*), Dusky-footed Woodrat, Virginia Opossum, Striped Skunk, Raccoon, Coyote, Mountain Lion (*Felis concolor*), Bobcat (*Lynx rufus*), and Mule Deer.

## AQUATIC

Riverine systems provide habitat for aquatic wildlife species as well as water resources for terrestrial wildlife species. The general aquatic wildlife habitats of the Ojai streams include the Riverine Lower Perennial Wetland (water always present) and Riverine Intermittent Streambed Wetland (water present some of the time), which are described above in more detail in the Riverine System subsection (Cowardin et al. 1979).

Cobble-Gravel is the subclass to the Riverine classes – Lower Perennial Unconsolidated Shore, Lower Perennial Unconsolidated Bottom, and Intermittent Streambed (described above in the Riverine System subsection) – that generally represents most of the Ojai streams. Cobble-Gravel is characterized by the unconsolidated particles that are smaller than stones and have been transported by waves and currents. Shell fragments, sand, and silt fill the spaces between the larger particles, while stones and boulders may be also scattered about this subclass. The predominant invertebrates of the Cobble-Gravel subclass include the following: midges (*Diamesa* spp. and *Chironomus* spp.), stonefly-midges (*Nemoura-eukiefferiella* spp.), freshwater mollusks (*Anodonta* spp., *Elliptio* spp., and *Lampsilis* spp.), freshwater sponges (*Eunapius* spp.), mayflies (*Baetis* spp. and *Caenis* spp.), mosquitoes (*Anopheles* spp.), aquatic snails (*Lymnaea* spp. and *Physa* spp.), Oligochaete Worm (*Limnodrilus* sp.), Toad Bug (*Gelastocoris* sp.), Leech (*Erpodella* sp.), Scud (*Gammarus* sp.), and Spring-tail (*Agrenia* sp.). (Cowardin et al. 1979.)

The most important physical parameters for fish are stream depth, current velocity, substrate composition, cover, and temperature (Faber et al. 1989). However, the composition and structure of the associated riparian community can have a significant effect on the overall quality of the instream environment for fish. A well-established riparian corridor is important for fish in that shade provided by vegetation maintains cooler stream temperatures during the summer months. In addition, the

presence of a well-developed riparian community provides an ongoing source input of woody debris within the stream channel, which consequently provides cover and refuge for fish and other wildlife.

Various resident fish species that are known to occur within the Riverine habitats of the San Antonio Creek system include: Prickly Sculpin (*Cottus asper*), Partially Armored Threespine Stickleback (*Gasterosteus aculeatus microcephalus*), Fathead Minnow (*Pimephales promelas*), Rainbow Trout (*Oncorhynchus mykiss*), and Arroyo Chub (*Gila american*) (Hunt 1991). Nonnative, warm-water species known to occur within portions of the study area include Green Sunfish (*Lepomis cyanellus*), Channel Catfish (*Ictalurus punctatus*), and Carp (*Carassius auratus*).

Two species of Southern Steelhead are present within the Ventura River and San Antonio Creek systems, including its tributaries, Pacific Lamprey (*Lampetra tridentata*) and Southern Steelhead (*Oncorhynchus mykiss irideus*, the migratory form of Rainbow Trout). The Pacific Lamprey spends one to two years in ocean waters as an adult before returning to its native stream to spawn. Upstream migration of this species to spawning areas usually occurs between April and late July (Moyle 1976). The life history of Southern Steelhead is discussed above in the Introduction section.

Amphibians and reptiles are well represented within riverine habitats of the Ojai Basin streams. Amphibians and reptiles known or expected to occur in the riparian habitats of the Ventura River and associated tributaries, as well as adjacent upland habitats, include California Toad, Pacific Treefrog, Black-bellied Slender Salamander, and Western Aquatic Garter Snake. The Bullfrog (*Rana catesbiana*) is an introduced species native to the East Coast of North America, and is expected in the creeks of Ojai. The introduction and presence of the Bullfrog in many California streams is most likely contributing to the decline of several native amphibian and reptile species (Faber et al. 1989).

Numerous bird species will frequent Riverine habitats for hunting resources to prey upon fish and amphibians, and they include Great Blue Heron, Great Egret, Black-crowned Night Heron, and Belted Kingfisher (*Ceryle alcyon*). Other foraging bird species of Riverine habitats include Mallard, American Coot (*Fulica Americana*), Killdeer (*Charadrius vociferous*), and Cliff Swallow (*Petrochelidon pyrrhonota*). Upland mammals will frequent the creeks and tributaries of the San Antonio Creek Watershed, and associated riparian zones, for the variety of food resources available and water. Upland mammals that frequent riverine habitats of the Ojai streams include Mule Deer, Coyote, Bobcat, Mountain Lion, and Gray Fox.



**Photograph 38** (left). Grandview-Park Drain showing Raccoon and bird tracks in the Riverine habitat (27 May 2004). **Photograph 39** (middle). Stewart Canyon Creek Reach 1 showing the root wads under which a Steelhead was observed (6 December 2004). **Photograph 40** (right). Stewart Canyon Creek showing a Mallard foraging in the stream channel.